

The Relationship Between Sustainable Supply Chain Management Practices and The Product Quality in The Pharmaceutical Companies in Egypt

Prof.Dr.Amgad Hamed Omara*
Shiry Ibrahim Amin Micheel **

*Professor of Business Administration & Human Resources Management, Dean of the Faculty of Commerce, Menoufia University, Egypt.

Email: amgadomara63@yahoo.com

** Lecturer Assistant in Business Administration Department, Faculty of Commerce, Menoufia University, Egypt. Master of Business Administration (MSc), 2016. Research Interests: Sustainability, Supply Chain Management, Marketing.

Email: shiry.ibrahim@ccommerce.monofia.edu.eg

Abstract:

This study was designed to investigate the relationship between the relationship between sustainable supply chain management practices and the product's quality in public, private and international pharmaceutical companies in Egypt. The instrument of collecting data for this study was a questionnaire. The questionnaires were distributed mainly among personnel engaged in the jobs related to SCM or OM (such as CEO, president, directors, supply chain managers, operations managers, Research and Development managers, general managers, supervisors and senior staff), who possess sufficient knowledge about SSCM and organizational culture in different pharmaceutical companies located in Egypt, by introducing hard copy in these companies or soft copy through an online link that contains the questionnaire items translated into Arabic via personnel Email, LinkedIn or even via what's app. among the sample units between the period from August 2021 to October 2021.

The results supported the relationship between Sustainable supplier management (upstream), Sustainable operations and risk management (focal company), Other sustainability practices and the product's quality. On the other hand, the results didn't support the relationship between Pressure & incentive management (downstream) and the product's quality. Based on these results, the researcher proposed a number of recommendations for managers aiming to push the sustainability agenda are revealed in the final point by providing information to SC managers on the most conducive practices that their peers consider to be important in general, also by providing practitioners with a better knowledge of the scope of both the challenges and opportunities associated with long-term supply chain management and finally providing a roadmap for tackling sustainability concerns and developing successful SSCM for practitioners.

ملخص البحث

يتمثل الهدف الرئيسي لهذا البحث في دراسة العلاقة بين ممارسات ادارة سلاسل الامداد المستدامة و جودة المنتج في شركات الأدوية العامة والخاصة والدولية في مصر. ولدراسة مشكلة البحث تقترح الدراسة فرض رئيسي لدراسة هذه العلاقة ويتكون مجتمع البحث من رئيس الشركة أو مديرين سلاسل الامداد والانتاج والبحث والتطويرأو المدير العام أو المشرفين وكل من يملك

معلومات وخبرات كافية عن ممارسات ادارة سلاسل الامداد والثقافة التنظيمية داخل شركات الأدوية العامة والخاصة و الدولية . ولأغراض جمع البيانات فقد تم تصميم قائمة استقصاء تم توزيعها على عينة البحث داخل شركات الأدوية أو عن طريق الانترنت ، ثم تحليل تلك البيانات باستخدام برنامج التحليل الاحصائي (SPSS) لاختبار مدى معنوية وقوة العلاقة بين متغيرات الدراسة مثل التحليل الوصفي لمفردات العينة ، تحليل الارتباط ، وتحليل الانحدار . وقد توصلت الدراسة لمجموعة من النتائج أهمها: وجود علاقة معنوية طردية بين إدارة الموردين المستدامة و العمليات المستدامة وإدارة المخاطر و ممارسات ادارة سلاسل الامداد المستدامة الأخرى وجودة المنتج داخل شركات الأدوية. بينما لا توجد علاقة معنوية بين إدارة الضغط والحوافز وجودة المنتج داخل شركات الأدوية. وبناءً على نتائج هذه الدراسة فقد قام الباحث باقتراح عدد من التوصيات للمديرين الذين يهدفون إلى دفع أجندة الاستدامة ، من خلال توفير المعلومات لمديري الادارة العليا حول الممارسات الأكثر ملاءمة التي يعتبرها أقرانهم مهمة بشكل عام ، وأيضاً من خلال تزويد الممارسين بمعرفة أفضل بنطاق كلا من التحديات والفرص المرتبطة بإدارة سلاسل الامداد طويلة الأجل ، وأخيراً توفير خارطة طريق لمعالجة مخاوف الاستدامة وتطوير ممارسات ادارة سلاسل الامداد المستدامة الناجحة للممارسين.

Introduction

Supply Chain Management (SCM) is a broad topic and has been examined by researchers from different angles in the last years. One prominent research field is sustainability in SCM, namely Sustainable Supply Chain Management (SSCM).

Both research and practical implementation have been growing steadily in the last decade in this specific area (Seuring and Müller, 2008a; Carter and Easton, 2011; Ahi and Searcy, 2013). Among others SSCM allows companies to implement corporate responsibility practices and achieve a higher efficiency in logistics performance and resource usage (e.g., Gold et al., 2010; Carter and Easton, 2011) while pursuing the three dimensions of sustainability, i.e., economic, social and environment goals.

One driver for such corporate action is constant changes in supply chain configurations, which have raised concerns about how and whether this could contribute to sustainability (Halldorsson et al., 2009) and demanding strategic actions being taken. This offers a link into another field of management research, i.e., the competitive capabilities approach that firms employ to reach a competitive advantage.

Business capabilities are a combination of business processes, people (organization, knowledge and skills, culture), technology solutions, and assets (facilities, funds, etc.) aligned by strategic performance objectives. Capabilities are the building blocks of the enterprise and they have relationships to each other and to the environment. Together, people, process, technology and performance management yield a capability that has quality characteristics. These quality characteristics are important in driving the capability design process (Porter & Kramer, 2006). It is the organization's ability to perform better than competitors using a distinctive and difficult to replicate set of business attributes. Capability is a capacity for a set of resources to interactively perform a stretch task (Porter & Kramer, 2006).

According to the new resource-based view of the company, sustainable competitive advantage is achieved by continuously developing existing and creating new resources and capabilities in response to rapidly changing market conditions. Among these resources, in the new economy,

competitive capabilities represent the most important value-creating asset (Porter & Kramer, 2006).

Section 2 reviews relevant literature. Section 3 outlines the research methodology applied in this research. The results of data analysis are shown in Section 4. Section 5 discusses theoretical and managerial implications before Section 6 displays limitations and suggests future research.

1. Literature review and conceptual framework

1.1SSCM practices

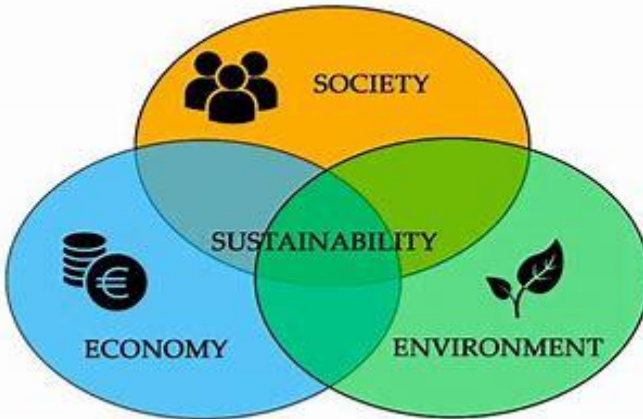
Sustainability has become an instrument for large companies to subsume diverse company initiatives pertaining to CSR, environment, and profitability. It provides companies a way to align their CSR and environmental efforts with profitability. Originally, the concept was conceived as being broader in scope (Elkington, 1998), the Brundtland Report of the World Commission on Environment and Development (WCED, 1987) as: “the development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Carter & Rogers, 2008).

Elkington (1998) presents sustainability as having three ‘pillars’—economic, environmental and social—with overlapping zones. Such overlapping zones are helpful for a company because it can report initiatives as serving the environmental (or social) cause even when these are economically motivated. Indeed, the most commonly reported initiatives in companies’ sustainability reports are about the reduction in energy consumption. However, the focus on overlaps avoids the awkward question of how to make trade-offs between profitability and social objectives (Pagell & Shevchenko, 2014). In the twenty-first century, this concept played a fundamental role in the supply chain of the companies.

Supply Chain Management (SCM) is described as the management of exchange of information and materials in logistics process that continues from raw materials procurement to delivery to the customer. In this process, a large number of suppliers, manufacturers, and customers are involved. SCM must be responsive to the flow of material in the supply chain and its relevance to the society and the environment. In this case, the response of supply chain management to three issues of environment, economy and

society makes up the core concepts of sustainable supply chain (ChardineBaumann & Botta-Genoulaz, 2014).

Figure (1) Sustainability Concept-Triple bottom line



It is essential that manufacturing companies move towards sustainable supply chain and respond to the environment. Environmental conditions have forced companies to implement sustainability strategies. Sustainability is not only good for the environment and society, but also for organizational economic health as it enables organizations in reducing risks, avoiding or reducing waste generation, increasing material and energy efficiency, and innovating by creating new and environmentally friendly products and services (Beske et al., 2014).

The SSCM emerged through incorporation of sustainability concepts into traditional supply chain management has started to attract increasing attention from both scholars and practitioners in recent years. The SSCM allows companies to implement corporate responsibility practices and achieve a higher efficiency in logistics performance and resource usage (Carter & Easton, 2011) while pursuing the three dimensions of sustainability, that is, economic, social and environment goals (Beske & Seuring, 2014).

Although SSCM has been recognized by many enterprises, the practice of SSCM has not been widely promoted in the business community, mainly because of the large investment in these practical activities, but the return of investment cannot be guaranteed (Linton et al., 2007). In addition, companies implementing SSCM practices will not only face the lack of green resources related technologies and capabilities, but also need to address a complex range of sustainable supply chain relationships (Matos & Hall 2007).

1.1.1 Sustainable supplier management (upstream)

Extant literature offers a number of definitions of sourcing, for example, sustainable sourcing is “a process of purchasing goods and services that takes into account the long-term impact on people, profits, and the planet” (Mulani, 2008). Another definition states that strategic sourcing is the management of “the firm’s external resources in ways that support the long-term goals of the firm” including sustainability (Wisner et al., 2014, p.105). While, yet another definition postulates that ethical sourcing is the process that accounts for “the public consequences of organizational buying or bring about positive social change through organizational buying behavior” (Leire & Mont, 2010, p. 29).

Sourcing, especially from suppliers in developing countries, can be risky as suppliers’ sustainability issues – e.g., safety, social and/or environmental violations – could expose the buyer to negative publicity, product boycotts, brand degradation, lower employee morale, and ultimately reduce sales and profits (Wisner et al., 2014). Therefore, businesses have to manage not only their own social and environmental impact but an impact of an entire supply chain (Porter & Kramer, 2006), where a focal firm bears the major responsibility for an entire supply chain network because supplier’s performance can greatly affect the buyer’s performance and reputation (Leire & Mont, 2010).

Also, the green degree of final product is related to manufacture’s production process, environment management factors, most importantly, it is decided by the green degree of raw materials provided by suppliers. Therefore, to provide green products that make customers satisfied and

promote the operation of the Green Supply Chain (GSC) effectively for manufacturer, one of the key steps is to purchase the suitable green raw material from its suppliers. In actual operation of GSC, manufacturers could usually detect the green degree of raw material or intermediate goods easily for green products which have low technical contents (the green degree involves the manufacturing technology of intermediate goods or final product, the R&D capability of green technology, material's components and so on) (Samir, 2007).

Another important, and sometimes overlooked, component of sustainable product design is packaging. Packaging is used to sell, inform, contain, protect, preserve, and transport products (Soroka 1999). After product use, all packaging joins the waste stream.

The main role of packaging is to prevent a product from damage but at the same time packaging must be simple, light on material use, and designed for reuse or recycling (Shi et al., 2012). Designing product that allows use and reuse of its components throughout a product lifecycle is an important step in achieving sustainability (Shi et al., 2012)

1.1.2 Sustainable operations and risk management (focal company)

Kleindorfer et al. (2005) defined sustainable operations management as a set of skills and concepts which facilitates structure and management of business processes aimed at balancing economic performance with the impact of operations on people and planet. Evolution toward sustainable operations, while may include a variety of environmental and social practices, e.g., Environmental Management Systems, Eco-design, Health and Safety, (Gavronski et al., 2011; Zhu et al., 2012; 2013;), must focus on development of both, sustainable product and sustainable process (Kleindorfer et al., 2005).

Sustainable process design addresses environmental friendliness of the processes (Narasimhan & Schoenherr, 2012) and is associated with waste reduction (e.g., reduction of time, material, resources), reuse, remanufacturing, and recycling. Sustainable process design defines efficient production methods and, therefore, is concerned with limiting and ideally

preventing inefficient use of materials, energy, and resources (Hart, 1995).

In general, the broad definition of green manufacturing is a process or system which aims to promote sustainability and to reduce the environmental impact by minimizing our dependency on natural resources and driving down pollution by intelligently recycling waste or through developing green products (Dornfeld, 2013).

1.1.3 Pressure & incentive management (downstream)

As found by Reference (Bhakoo et al., 2012), vendor-managed inventory is likely to work well for products with high and stable demand, which are not subject to highly-regulated environments, and when spatial complexity is low, the distance between organizations is not excessive and does not put supply at high risk of breakdown. Similarly, the use of hybrid stockless systems has been recommended. This involves the delivery of high-volume products directly to points of care and low-volume products to central stores (Bhakoo et al., 2012). A completely stockless system is ideal for removing central stores and releasing space (Landry & Philippe, 2004), but may fail in a remotely-located organizations in which response times might be significant (Bhakoo et al., 2012). Managing inventories and thereby controlling the material flows through a facility, or network of facilities, is a matter of key importance in achieving efficient supply chains. Inventory management may also involve strategic decisions regarding design of distribution and production networks, facility location, procurement, supplier selection, choice of product range, etc.

1.1.4 Other sustainability practices

Green product innovation (GPI) and design

Accordingly, GPI involves the design of energy-efficient innovative products and the use of ecofriendly or recovered materials or both as input measures in the production process (Amores-Salvado et al., 2014). Similar to conventional innovations, GPIs also bring new knowledge, resources, and technologies to firms to make the necessary adjustments to changing customer's tastes and demands and to institutional expectations (Zhang et

al., 2021). Customers are now becoming aware of the detrimental effects of the products they consume. In consequence, they are asking for and switching to less polluting products with a better lifespan (Chen, 2008).

Similarly, there is mounting pressure on firms from governmental regulatory bodies, nongovernmental agencies, rival firms, and indeed the media to switch to environmentally friendly products. Collectively, all stakeholders are pushing organizations to adhere to green labelling, adopt the certifications from the international organization for standardization (ISO), and make public disclosures related to the use of materials and energy in their production processes (Amores-Salvado et al., 2015). Consequently, organizations are becoming increasingly interested in adopting GPI. Ever since sustainable development goals came into force, sustainability has taken center stage in the innovation process. As a result, firms are feeling increasing pressure to develop sustainable products (Hofman et al., 2020). While innovation has always remained a critical success factor for firms across industries, producing greener products has become normal.

ISO 14001 environmental management system

The International Organization for Standardization (ISO) is continuously developing management standards that address environmental issues in organizations; consequently, the growing ISO 14000 family now includes, among others: environmental management systems, environmental performance indicators, life cycle assessments, eco-labels, and product design (www.iso.org for more details). One of the most widely utilized standards is the environmental management system (EMS) standard ISO 14001, which was introduced in 1996 and updated in 2004 (En ISO 14001, 2004). According to Potoski and Prakash (2005), the promise of ISO 14001 is that if a participating organization adheres to the requirements of the standard, it will increase the chance to reduce its environmental impacts relative to non-participating organizations.

The aims to comply with legal requirements and to create a systematic management system have been reported as important driving forces for companies to implement ISO 14001 (Rivera-Camino, 2001; Raines Summers, 2002). Also for companies that are not directly affected by environmental legislation, the ISO 14001 certificate can be a way to comply

with customers' environmental requirements (Hillary, 2004). The business opportunities of ISO 14001 can be illustrated by a study of Swedish companies where the implementation of the standard was motivated by the potential gains, such as improved corporate image, market advantages and satisfying customer requirements (Poksinska et al., 2003).

Public pressure is another example of an important driving force for the implementation of ISO 14001 in companies (Rondinelli et al., 2000). In this respect consumers are a large and powerful group that affects the overall environmental management strategies of companies and encourages the implementation of ISO 14001 (Anton et al., 2004). Bansal and Bogner (2002) found that ISO 14001 provided credibility and helps to increase the confidence of customers of retailing companies.

Corporate Social Responsibility

Corporate Social Responsibility was first proposed by a western scholar Sheldon in 1924, since when the definition and connotation of CSR had been debated heatedly and even today there is no agreement (Li & Wei, 2014). There are two core arguments: one is whether companies should bear their social responsibility. This debate lasts until the 1990s and a consensus has been reached, that is, companies should take social responsibility (Yan, 2011). The other argument is what kind of social responsibility they should bear, which is an important research point both in the academic and practical world. As this dispute encompasses not only theoretical studies on economy, law and ethics, but also practical explorations on relevant institutions, therefore, even today there is no settled answer.

At present, there are scholars in the fields of management, economics, law, sociology, ethics, etc., studying CSR institution in academia, but scholars in the field of law and management are engaged in more specific and in-depth discussions. As the field is different, the angle of view is not the same. Scholars in the field of law, sociology, and economics focus on the problems and suggestions of the existing CSR institution from national macro-perspective, while scholars in the field of ethics and management, from a micro-perspective, tend to explore the enterprises' internal management of social responsibility system, the external impact of social responsibility system on enterprises and the functional mechanism of the system promoting corporate social responsibility (Liu & Huang, 2017).

1.1.5 Product Quality

Competitive advantage is the extent to which an organization is able to create a defensible position over its competitors (McGinnis & Vallopra, 1999; Porter, 1985). It comprises capabilities that allow an organization to differentiate itself from its competitors and is an outcome of critical management decisions (Tracey et al., 1999). The empirical literature has been quite consistent in identifying price/cost, quality, delivery, and flexibility as important competitive capabilities (Tracey et al., 1999). In addition, recent studies have included time-based competition as an important competitive priority.

Research by Handfield and Pannesi (1995) identifies time as the next source of competitive advantage. On the basis of prior literature, Koufteros et al. (1997) describe a research framework for competitive capabilities and define the following five dimensions: competitive pricing, premium pricing, value-to-customer quality, dependable delivery, and production innovation.

competitive capabilities represent the manufacturer's actual, or 'realized', competitive strength relative to primary competitors in its target markets (Stalk et al., 1992; Ward et al., 1994). A significant body of prior empirical research indicates that capabilities such as quality, delivery, flexibility, and/or cost contribute positively to business performance, either acting alone or in concert with other capabilities (see, e.g. Vickery et al., 1993, 1994, 1997; Ward et al., 1994).

How to identify sources of competitive advantage has been a question for researchers and firm managers for decades. Barney (1995) refers to SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis, and believes this has long been an interesting task for firms. The analysis helped firms to better understand their sources of competitive advantage.

According to the research of Barney (1995), firms should consider four important questions about their resources and capabilities while creating the analysis that will help them try to gain competitive advantage: the question of value, the question of rareness, the question of imitability and the question of organization. Peteraf (1993) reports that resources which are the basis of a company's strategy must meet four conditions if firm will gain

competitive advantage: resource heterogeneity, ex post limits to competition, imperfect resource mobility and ex ante limits to competition.

1.1.6 The question of value

Barney (1995) writes that the question of value is the first question to be asked by managers while evaluating competitive capabilities. In other words, the question is whether the firm's resources and capabilities add value. Also capabilities may have added value in the past, but that changes in customer tastes, industry structure or technology, for instance, may have reduced the value. Therefore "one of the most important responsibilities of strategic managers is to constantly evaluate whether or not their firm's resources and capabilities continue to add value, despite changes in the competitive environment" (Barney, 1995, p. 51). The answer links the analysis of internal resources and capabilities with the environmental analysis. Logistics managers try continuously to create value for their firms by optimal equipment utilization. The importance of this need can be exemplified in the existence of the many transportation systems that have arisen to help firms create more efficient transportation solutions (Olavarrieta & Ellinger, 1997).

Logistics distinctive capability as a valuable resource is defined as: (Novack, et al., 1992, p. 236): "...the creation of time, place, quantity, form and possession utilities within and among firms and individuals through strategic management, infrastructure management, and resource management with the goal of creating products/services that satisfy the customer through the attainment of value."

Olavarrieta and Ellinger (1997) write that firms' increased interest in efficient consumer response initiatives, just-in-time supply programs and quick response systems show that logistical distinctive capabilities are rising as valuable factors in the development of customer-oriented corporate strategy.

These kinds of programs tend to give logistics a position as a strategic resource, aimed to render customer satisfaction through inventory availability, timely delivery and less product failure or returns. Lambert & Stock (1993, p.13) also discuss customer satisfaction. In their own words, "Each element of a firm's logistics system can affect whether a customer

receives the right product at the right place in the right condition for the right cost at the right time". Peteraf (1993) discusses heterogenic resources, which means that characteristics of resources vary between companies. It can also be a base for competitive advantage to exist. Companies endowed with those kinds of resources are able to compete in a marketplace and to better meet customer need.

1.1.7The question of rareness

If a firm's resources and capabilities are considered to be valuable, another question is if they are rare among competing firms. Barney (1995) points out that they must be rare to be a source of competitive advantage, at least for a temporary time. Peteraf (1993) discuss ex post limits to competition; if a resource will provide a long-term comparative advantage for a company, there must be a limited number of other companies with the same resources.

1.1.8The question of imitability

When the firm's resources and capabilities are considered to be both valuable and rare, it means that the firm can gain at least a temporary competitive advantage. The question of imitability addresses whether competing firms meet cost disadvantage by imitating the resources and capabilities. Barney (1995) feels that it would be possible for a company that controls these special abilities to gain sustainable competitive advantage. Further, there are two ways in which imitation could occur through (duplication and through substitution). Duplication means that a firm tries to imitate another firm and build the same kind of resources. Substitution means that a firm tries to substitute one kind of resource with other kind of resource.

Barney has found that there is a special reason why some of these internal attributes of firms could be costly to imitate. Barney (1995, p.53) groups them in three parts:

- The importance of history in creating firm resources
- The importance of numerous "small decisions" in developing, nurturing, and exploiting resources

- The importance of socially complex resources

In the importance of history, Barney includes the firm's abilities, skills and resources which have become unique to them through their particular history. Barney (1995) also reflects how the unique mix of experiences, personalities and relationships that may exist only in single firms can affect these resources and capabilities. In the importance of numerous small decisions, Barney discusses that a firm's competitive advantage more often seems to be a result of numerous small decisions, which have affected the firm's resources and capabilities in a positive way. Further, Barney (1995) points out that the results of small decisions are essentially more difficult for competing firms to imitate than big decisions. Big decisions are often easier to describe, as well as more obvious. In the importance of socially complex resources, Barney includes phenomena in firms like culture, friendship, reputation, teamwork and trust. All of these are difficult for competing firms to imitate (Barney, 1995).

Duplication may take place when firms try to imitate other firms' routines, after observing them and finding them to be successful, such as emulating routines concerning how to produce a better product. The imitator normally cannot make perfect observations about what they want to duplicate, which might lead to difficulties if problems would arise in the copy. Resolving the problems would be impossible since there is no possibility for a closer inspection of the original (Nelson & Winter, 1991). According to Rumelt (1984), companies may try to create isolating mechanisms for the purpose of stopping or delaying new actors from entering the market. New actors should face several competitive disadvantages compared with already established companies.

Companies can benefit from the isolating mechanisms when battling against the potential risks. For example, if a company has exquisite information (special information) of potential suppliers in new geographical areas, they can feel safer against the risks of changing trade regulations (Changes in law, tax and regulations) in the current supplier base. Another example can be the

customer relations (Consumer and producer learning), with a co-operation in product design phase, the company will increase the possibilities to quickly find out eventual changes in customer tastes.

Peteraf (1993) describes imperfect resource mobility. It helps companies to achieve sustainable competitive advantage, because they limit other companies' possibilities to copy or transfer important resources. Often it is not meaningful to copy or transfer a single resource as it decreases in value when it is not used in the right environment. Ex ante limits to competition is also important, if the competition about a resource is too intensive, the costs for acquiring it may be higher than the obtained value. Olavarrieta and Ellinger (1997) mean that many logistics researches have pointed out the difficulties in copying firms' distribution and logistics systems.

Distinctive logistics capabilities may involve a complex combination of organizational routines, people skills, knowledge and physical assets. They also refer to a study, which shows that it is possible to design distribution, as a unique offering that cannot be duplicated by competitors. Lambert & Stock (1993) describes firm's logistics systems as proprietary assets that theoretically should be listed as intangible assets on the corporate balance sheets. They also mean that competitors cannot easily duplicate the logistics.

1.1.9 The question of organization

According to Barney (1995), when a firm has identified their resources and capabilities as valuable, rare and difficult to imitate, they must also be well organized to fully realize their competitive potential. Among organizational components there are reporting structures, management control systems and compensation policies. These components may lead to competitive advantage, not isolation, but in combination with other resources and capabilities. Prahalad & Hamel (1990) explain that the real sources of advantage can be found in the management. To enable a business to adapt quickly to a changing environment, the management has to consolidate corporate-wide technologies and production skills into competencies.

Olavarrieta and Ellinger (1997) mean that despite a growing understanding for logistics as powerful strategic sources of sustainable

competitive advantage in marketing and management literatures, problems remain. Many firms still regard logistics functions as a separate part of their business, whose activities are distinct from the rest of the firms' activities. Therefore, many firms have not paid what is deserved attention to the strategic role of logistics. Olavarrieta and Ellinger (1997) point out that firms' logistics capabilities can be valuable, rare and difficult to copy. Consequently, they could become strategic resources among firms in the same industry. Further, Olavarrieta and Ellinger (1997) discuss the problems logistics managers may face when determining which capabilities or service performance areas they should focus on or develop in advance.

When creating customer value through logistics they need to react quickly to the rapidly changing world, customer needs and continuously shifting expectations. Competitors, technology, legislation and regulation are other areas that may impact logistics and how some firm serves customers. Olavarrieta and Ellinger (1997) state that logistics managers should be allowed to participate in decisions and issues related to, for example customer needs, information processing, production and technology. Christopher (1998) explains that effective logistics management can help firms gain competitive advantage, under circumstances where the logistics systems are designed on the basis of customer needs. Supply chain management can be seen as an extension of logistics management.

Product Quality

Quality refers to the extent to which the manufacturing enterprise is capable of offering product quality and performance that creates higher value and would fulfill customer expectations. Quality gauges the capability of the firm to design and produce products that would fulfill customer expectations (Hall et al., 1991). Quality is expected to have significant effects on competitive price and premium price capabilities. Higher quality levels usually lead to lower costs, and lower costs allow firms to compete on prices (Garvin, 1984). Philips et al., (1983) found that higher perceived quality was indeed related to higher market share and lower costs. Fine's (1983) results indicated that costs declined more rapidly for firms that produced high-quality products than for firms that produced low-quality ones.

Ferdows and De Meyer (1990) results showed that conformance quality was significantly related to delivery dependability but not with production cost and overhead cost. Sluti (1992) found that conformance quality had a positive relation with delivery dependability. As a company meets customer expectations, they tend to have fewer product returns, fewer defects and warranties claims, and higher customer goodwill. Firms may also command premium prices based on product differentiation and improved quality. Indeed, customers are sometimes willing to pay a premium price to get better quality (Porter, 1980, 1985), whether it is perceived quality or real. Firms that deliver products that match customer quality requirements may capture market share and build customer loyalty.

1.2 Research Problem

The governments are under tremendous pressure to sustain manufacturing growth to improve quality of life of their citizen. Unfortunately, the manufacturing sector consumes lot of energy and other resources and emits large amounts of greenhouse gases which increase environmental problems like climate change and global warming (Mittal and Sangwan, 2014).

Consumer pressure, government regulations, and stakeholder demands for a competitive edge have forced industries to consider their environmental and social impacts in addition to their economic status. These pressures have led many businesses to adopt Sustainable Supply Chain Management (SSCM) practices (Mathivathanana et al, 2018). With today's global awareness of environmental risks as well as the pressing needs to compete through efficiency, manufacturing systems are evolving into a new paradigm (Deif, 2011).

Compliance with sustainable regulation obliges the supply chain members to implement possibly costly adaptation processes that can affect their competitiveness and profits as much as they transform production/service methods and systems (Abbasi and Nilsson, 2012). Also, Walkera and his colleagues (2008) argue that cost and customer desire for lower price may inhibit environmental goals.

In regard to "goal 3: good health and wellbeing" under the SDGs, pharmaceutical companies are addressing this goal from the viewpoint of

improving access to healthcare. There are many people with insufficient access to the healthcare they need due to the lack of available treatments, poverty, challenges in healthcare systems and limited healthcare information.

Based upon the exploratory study and the literature review, the problem of this study can be formulated in the following statement.

“The typical organization's supply chain generates far more social and environmental costs than its own operations, so they are under enormous pressure to sustain their supply chain management practices, which is accompanied by a fear of paying a high cost in the short term to be sustainable, and this is due to a lack of understanding of the relationship between SSCM practices and product quality”.

To bridge this research gap, therefore, this study proposes a theoretical model to investigate how SSCM may affect product quality and in turn how SSCM may improve product quality. Accordingly, this study attempts to answer the research questions:

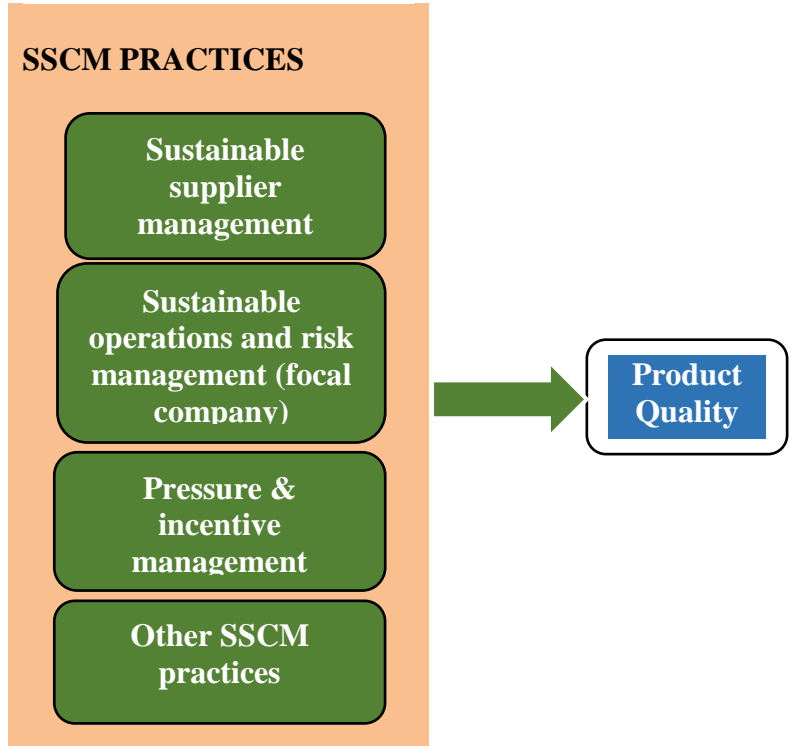
- **RQ1** Which practices are commonly applied in SSCM?
- **RQ2** Is there any impact on the product quality in the organization?
If yes,
- **RQ3** what is that impact?

1.3 Research Hypothesis

To answer the research questions and achieve the objectives of this research, the following hypothesis is proposed:

- ✚ **H01** There is no significant relationship between SSCM practices and company's product quality.

Figure (2) Research Model



The research aims to contribute to providing new insights for managers in the above associations through a large-scale survey-based study which provides empirical evidence that has been scarce in SSCM field.

2. Research method

The research population was based on data from the Central Agency for Public Mobilization and Statistics (CAPMAS, 2018) in its fifth Economic Census (EC), which is the primary source of information on Egypt's economic activities. The sample is selected from the 350 pharmaceutical enterprises operating in Egypt, with 12 firms (3.43 percent) belonging to the governmental sector and 338 firms (96.57 percent) to the private sector.

Because sustainable supply chain practices are well-evidenced at these corporations in particular when compared to other corporations in different industries, the research study was applied to public, private, and multinational pharmaceutical corporations working in Egypt as a manufacturing-based supply chain setting.

The survey's respondents were mostly people who work in SCM or OM jobs (including CEOs, presidents, directors, supply chain managers, operations managers, R&D managers, general managers, supervisors, and senior employees) who have a good understanding of SSCM and organizational culture. Respondents who worked for distribution pharmaceutical companies rather than manufacturing and production pharmaceutical enterprises were removed from the study.

The sample method to be utilized will be probability sampling. This method will be used to ensure that every member in the population has an equal and independent chance of being selected to be included in the sample. The sample size was determined according to the following formula:

$$n = \frac{z^2 p(1-p)}{e^2}$$

By solving the previous equation for n yields the following result:

$$\text{Sample size} = \frac{1.96^2 (.5)(1-.5)}{.05^2} = 384 \text{ manager}$$

This study was designed to investigate the relationship between the sustainable supply chain management practices and the product quality in the pharmaceutical companies. The instrument of collecting data for this study was a questionnaire containing 36 questions. CEOs, presidents, directors, supply chain managers, operations managers, Research and Development managers, general managers, supervisors, and senior staff in manufacturing, supply chain management, and operations positions who have sufficient knowledge of SSCM and organizational culture were given self-administering questionnaires with cover letters that ensured confidentiality and data aggregation. To discover appropriate contacts in public, commercial, and multinational pharmaceutical businesses functioning in Egypt, the researcher employed personal contact (phone conversations and face-to-face), email, and supply chain and sourcing

groups within business-related social networks such as LinkedIn. To enhance the response rate, follow-up phone calls and emails were made every two weeks. A total of 241 of the 483 questionnaires issued have been returned, completed, and are available for further analysis, resulting in a response rate of 49.90 percent. The survey questionnaire was prepared based on validated and reliable measurement scales found in the literature. The items of the questionnaire are presented in the Appendix.

The instrument of collecting data for this study was a questionnaire that consisted of three major parts; **Part (I)** Sustainable supply chain management practices, **Part (II)** product quality and **Part (III)** asked for demographic characteristics.

Part (I) Sustainable Supply Chain Management practices: the questionnaire that was used is multidimensional SSCM practices that was adapted from Tan and Zailani (2016), Hamdy et al., (2018), Das (2017), Paulraj et al., (2017) and Dai et al., (2014). **Part (II)** Product Quality: product quality is assessed by 5 items; the items are adapted from Aboelmaged (2018). A five-point Likert-type scale was used to assess the capabilities of a firm compared to the average in the industry. Respondents were asked to indicate items that best describe the extent they agree or disagree (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 =strongly agree).

Moreover, in **part (III)** the questionnaire captures various descriptive variables that profile the respondents' demographics (i.e. age, gender, work experience and organizational position). Responses to each of these demographics are captured using nominal scale with multiple items.

3. Results and analyses

Here, the field study including the results of data analysis that was collected from directors, CEO, supply chain managers, operations managers, R&D managers and others at different pharmaceutical companies and knowing their different opinions through distributing a questionnaire list, which was designed especially for this purpose. Descriptive analysis of the study variables and questions are included. The proposed hypotheses were then tested by using the suitable statistical methods, in order to provide answers for the study questions.

4.1 The Reliability and Validity of the Questionnaire:

Reliability analysis was conducted to investigate the internal consistency of the questionnaire. The internal consistency reliability means the extent to which there is cohesiveness among the questionnaire's items that has been used in the field study Yang and Green (2011). The coefficients of Cronbach Alpha (α) were calculated to measure the internal consistency reliability. According to Yang and Green (2011) the acceptable values of Cronbach Alpha coefficients range from 0.60 to 0.95.

Validity is also required in order to ensure the adequacy of the measurement's instruments. The validity coefficient is equal the square root of alpha Cronbach coefficient, it has to be in the needed limit (equal or more than 60%) Yang and Green (2011).

The Alpha coefficient of total SSCM practices, which represents the independent factor is equal 0.957 and the validity coefficient equals 0.97826, which also is within the acceptable value. coefficient equals 0.97826, which also is within the acceptable value. On the other side, the Alpha coefficient of the product quality, which represents the dependent variable is equal 0.874 and the validity coefficient equals 0.93488, which also is within the acceptable value.

4.2 Descriptive Analysis of the Participants:

In this part the researcher will provide a profile analysis about the participants in the field study which describes their demographic attributes. The following demographic data were collected: age, gender, job title and years stayed at the organization in public, private and multinational pharmaceutical companies.

The following tables summarizes the demographic data of the participants and characteristics of the companies.

Table (1) The Sample's Profile

Demographic Variables		Public companies		Private companies		Multinational companies		Total	
Age	From 20-29	12	4.98%	32	13.28%	12	4.98%	56	23.2%
	From 29-39	24	9.95%	71	29.5%	29	12.03%	124	51.5%
	From 39-49	12	4.98%	18	7.47%	13	5.93%	43	17.8%
	From 49-60	12	4.98%	0	0%	6	2.49%	18	7.5%
	Total	60	24.9%	121	50.2%	60	24.9%	241	100%
Gender	Male	24	9.95%	90	37.34%	54	22.41%	198	82.2%
	Female	6	2.49%	31	12.86%	6	2.49%	43	17.8%
	Total	60	24.9%	121	50.2%	60	24.9%	241	100%
Job title	Manager	24	9.95%	2	0.80%	0	0%	26	10.8%
	Supply Chain Manager	19	7.89%	47	19.50%	43	17.84%	109	45.2%
	Operations Manager	2	0.80%	1	0.40%	4	1.60%	7	2.9%
	Other	15	6.22%	71	29.5%	13	5.93%	99	41.1%
	Total	60	24.9%	121	50.2%	60	24.9%	241	100%
Years stayed at the organization	Under 2 years	0	0%	6	2.49%	5	2.0%	11	4.6%
	2-5 years	12	4.98%	32	13.28%	7	2.90%	51	21.2%
	6-10 years	6	2.49%	33	13.69%	18	7.47%	57	23.7%
	Over 10 years	42	17.43%	50	20.7%	30	12.45%	122	50.6%
	Total	60	24.9%	121	50.2%	60	24.9%	241	100%

Source: statistical results

As the researcher can notice from table (1),

Approximately more than half of this study's participants (51.5%) fall in the age category from 29 years old to 39 years old and respondents from 49 years old to 60 years old were only 7.5%. Also, the majority of the respondents were male (82.2%) while 17.8% only were females. Supply chain managers represent 45.2% of the total participants of the study then comes Research and Development managers with 41.1%, while managers

and operations managers represent only 13.7% of the total participants of the study. Additionally, we can notice that more than 50.6% of the respondents have more than ten years of professional experiences, and the fewest percentage (4.6 %) have less than two years of professional experiences. Furthermore, the response rate from the private pharmaceutical companies is 50.2% while the response rate from both the public and multinational pharmaceutical companies was the same with 24.9%.

4.3 Testing the Study’s Model and Hypothesis:

In this part, proposed research hypotheses were tested to figure out the answers to research questions through a series of correlation and regression analysis.

First: the correlation

Table (2)

Correlation Matrix for Company’s SSCM Practices and Product Quality Model

		YQ	M	MU	MF	MD	MO
YQ	Pearson Correlation	1	.677**	.600**	.549*	.707**	.660**
	Sig. (2-tailed)		0.000	0.000	0.020	0.000	0.000
M	Pearson Correlation	.677**	1	.928**	.914**	.933**	.920**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000
MU	Pearson Correlation	.600**	.928**	1	.803**	.853**	.764**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000
MF	Pearson Correlation	.549*	.914**	.803**	1	.770**	.797**
	Sig. (2-tailed)	0.020	0.000	0.000		0.000	0.000
MD	Pearson Correlation	.707**	.707**	.853**	.770**	1	.841**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.000
MO	Pearson Correlation	.660**	.920**	.764**	.797**	.841**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Statistical results

From table (2):

The correlation coefficient with only two star (**) can express a strong significant association at 1% significance level, such as the correlation coefficient between MU (Sustainable Supplier Management (Upstream)) and YQ (product quality), MD (Pressure & Incentive Management (Downstream)) and YQ (product quality), and finally MO (other SSCM practices) and YQ (product quality) are (.600**, .707**, .660**) respectively, which means there is a positive correlation between each of them. While, the correlation coefficient with only one star (*) can express a significant relationship at 5% significance level, such as the correlation coefficient between MF (sustainable operations and risk management (focal company)) and YQ (product quality) which is (.549*) meaning a significant association between them.

Additionally, the researcher notes that the correlation coefficients between MU and MF, MU and MD, MU and MO, MF and MD, MF and MO, and finally MD and MO are (.803**, .853**, .764**, .770**, .797**, .841**) respectively, which mean there are positive correlations between them.

As a result, the researcher rejects the null hypotheses and accepts the alternative hypotheses that there is significant relationship between SSCM practices and product quality in the pharmaceutical companies.

Second: The coefficient of determination - Goodness of fit

Table (3) (Model Summary)

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	F	Sig.
6	.720a	0.518	0.510	0.50202	63.375	.000

a. Predictors: (Constant), Other SSCM practices, Sustainable supplier management (upstream), Sustainable operations and risk management (focal company), Pressure & incentive management (downstream)

Statistical results

From the above table (3), it is clear that total correlation (R) equal (.720). The coefficient of determination (R²) equal to (0.518), and this indicates that the independent variables (SSCM practices) explain (51.8%)

of any change in competitive capabilities. In addition, the regression model statistically significant when the F test is significant at level of confidence (.95).

Third: Coefficient table

Table (4) (Coefficient of Model)

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.761	0.179		9.840	.000		
Sustainable Supplier Management (Upstream)	0.528	0.132	0.499	4.001	0.000	0.423	2.365
sustainable operations and risk management (focal company)	0.559	0.105	0.557	5.321	0.000	0.733	1.365
Pressure & Incentive Management (Downstream)	-0.075	0.076	-0.085	-0.980	0.328	0.377	2.654
other SSCM practices	0.237	0.082	0.270	2.906	0.004	0.826	1.211

Statistical results

Hypotheses tests

Null hypothesis: beta coefficients equal to zero ($\beta=0$)

The alternative hypothesis: beta coefficients are not equal to zero ($\beta\neq 0$)

The previous table shows the values of independent variables coefficient and the researcher finds that the model variables are statistically significant at a confidence level (0.95), and then reject the null hypothesis and accept the alternative hypothesis that the independent variables have real value coefficients different from zero and they have a real impact on the product's quality.

Also, Variance Inflation Factor (VIF) for every variable of independent variables coefficient did not exceed the maximum value of its best and which is equal to (5).

Four: Regression equation

$$YQ = b_0 + b_1MU + b_2MF + b_3MD + b_3MO$$

The product quality = 1.761 + 0.528 (Sustainable Supplier Management (Upstream)) + 0.559 (sustainable operations and risk management (focal company)) - 0.075 (Pressure & Incentive Management (Downstream)) + 0.237 (other SSCM practices)

Results: The researcher rejects the null hypotheses and accepts the alternative hypotheses that there is significant relationship between SSCM practices and the product's quality in the pharmaceutical companies.

4. Discussion

The researcher discovered that SSCM practices are substantially related to product's quality after evaluating the research hypothesis. Product quality was found to be positively related to sustainable supplier management (upstream), sustainable operations and risk management (focal company), and other SSCM practices. This indicates that any increase or decrease in SSCM practices, including sustainable supplier management (upstream), sustainable operations and risk management (focal company), pressure and incentive management (downstream), and other SSCM activities, will explain any increase or decrease respectively in product quality. On the other hand, product's quality was found negatively related to pressure and incentive management (downstream), this indicates that any change in pressure and incentive management (downstream) will affect negatively on the product quality.

Finally, this research shows that there is a link between sustainable supply chain management (SSCM) practices and product quality in Egyptian pharmaceutical firms.

5. Limitations and future research

It's critical to recognize the limits of our work, which could lead to new avenues for research in the future.

To begin, the results' representativeness relied on survey data rather than experimental research approaches.

Second, the response rates were stated to be 49.90%. Although this response rate is respectable, it raises questions about the discrepancies between individuals who responded to the survey and those who did not, possibly showing a selection bias.

Finally, directors, CEOs, supply chain managers, operations managers, R&D managers, and other executives from public, private, and multinational pharmaceutical enterprises were included in the sample. Because several organizational characteristics are different from those in these pharmaceutical enterprises, the results should be cautiously extrapolated to other organizations in different sectors of different industries.

Fourth, the research sample was made up of 82.2 percent men and only 17.8 percent women, indicating a possible gender bias in the sample.

This study included a number of managerial contributions as well as a number of theoretical contributions. Some of the contributions are as follows:

- Providing information to SC managers on the most conducive practices that their peers consider to be important in general.
- Providing practitioners with a better knowledge of the scope of both the challenges and opportunities associated with long-term supply chain management.
- Providing a roadmap for tackling sustainability concerns and developing successful SSCM for practitioners.
- Future SSCM research should use a bigger sample size to better validate the current findings in other circumstances, which will help firms achieve more sustainable manufacturing.
- Future research could look into how each SSCM practice affects a company's competitive advantage. In the future, this effect could be investigated further in specific business areas.
- Future research that replicates this study across several industries and sectors will aid in our understanding of how sustainable supply chain management methods affect product quality.

References

- Abbasi, M & Nilsson, F. (2012). Themes and Challenges in Making Supply Chains Environmentally Sustainable. *Supply Chain Management: An International Journal*, Vol. 17, Issue 5, pp. 517-530.
- Aboelimged, M (2018). Direct and Indirect Effects of Eco-Innovation, Environmental Orientation and Supplier Collaboration On Hotel Performance: An Empirical Study. *Journal of Cleaner Production*, Vol 184, pp. 537-549.
- Ahi, P., & Searcy, C. (2013). A Comparative Literature Analysis of Definitions for Green and Sustainable Supply Chain Management. *Journal of Cleaner Production*, 52 (4), pp. 329-341.
- Amores-Salvado, J., de Castro, G. M., & Navas-L opez, J. E. (2014). Green Corporate Image: Moderating The Connection Between Environmental Product Innovation and Firm Performance. *Journal of Cleaner Production*, Elsevier Ltd., 83, pp. 356-365.
- Amores-Salvado, J., Martin-de Castro, G., & Navas-L opez, J. E. (2015). The Importance of the Complementarity Between Environmental Management Systems and Environmental Innovation Capabilities: A Firm Level Approach to Environmental and Business Performance Benefits. *Technological Forecasting and Social Change*, Elsevier Inc, 96, pp. 288-297.
- Anton WRQ, Deltas, G, & Khanna, M. (2004). Incentives for Environmental Self-Regulation and Implications for Environmental Performance. *Journal of Environmental Economics and Management*, 48(1), pp. 632-654.
- Barney, J. B. (1995). Looking Inside for Competitive Advantage. *Academy of Management Executive*, Vol. 9, No. 4, pp. 49-61.
- Bansal, P, Bogner, WC. (2002). Deciding on ISO 14001: economics, institutions, and context. *Long Range Planning*, 35(3), pp. 269-290.
- Beske, P., & Seuring, S. (2014). Putting Sustainability into Supply Chain Management. *Supply Chain Management: An International Journal*, 19(3), pp. 322-331.

- Beske, P., Land A., & Seuring, S. (2014). Sustainable Supply Chain Management Practices and Dynamic Capabilities in The Food Industry: A Critical Analysis of the Literature. *International Journal of Production Economics*, 152, pp. 131-143.
- Bhakoo, V., Singh, P., & Sohal, A. (2012). Collaborative Management of Inventory in Australian Hospital Supply Chains: Practices and Issues. *Supply Chain Manag.*, 17, pp. 217230.
- Carter, C. R. (2005). Purchasing Social Responsibility and Firm Performance. *International Journal of Physical Distribution and Logistics Management*, 35(3), pp. 177-194.
- Carter, C. R., & Rogers, D. S. (2008). A Framework of Sustainable Supply Chain Management: Moving Toward New Theory. *International Journal of Physical Distribution & Logistics Management*, 38 (5), pp. 360-387.
- Carter, CR., & Easton, PL. (2011). Sustainable Supply Chain Management: Evolution and Future Directions. *Int J Phys Distrib Logist Manag*, 41, 1, pp. 46-62.
- CAPMAS, Central Agency for Public Mobilization and Statistics. (2018). Annul Book (2017/2018) Egypt.
- Chardine-Baumann, E. & Botta-Genoulaz, V. (2014). A Framework for Sustainable Performance Assessment of Supply Chain Management Practices. *Comput. Ind. Eng.* 76, pp. 138-147.
- Chen, Y. S. (2008). The Driver of Green Innovation and Green Image—Green Core Competence. *Journal of Business Ethics*, 81(3), pp. 531-543.
- Christopher, M. (1998). *Logistics and Supply Chain Management*, Pearson Education Ltd, Harlow.
- Dai, J., Montabon, F. L., & Cantor, D. E. (2014). Linking Rival and Stakeholder Pressure to Green Supply Management: Mediating Role of Top Management Support. *Transportation Research Part E: Logistics and Transportation Review*, 71, pp. 173-187.
- Das, D. (2017). Development and validation of a scale for measuring Sustainable Supply Chain Management practices and performance. *Journal of Cleaner Production*, 164, pp. 1344-1362.

-
- Deif, A. (2011). A system model for green manufacturing. *Journal of Cleaner Production*, 19, pp. 1553-1559.
- Dornfeld, D. A., (2013). *Green Manufacturing: Fundamentals and Applications (Green Energy and Technology)*, Springer.
- Elkington, J. (1998). *Cannibals with Forks: The Triple Bottom Line of The 21st Century*, *New Society, Stoney Creek, CT*.
- En ISO 14001. (2004). *Environmental Management Systems – Requirements with Guidance for Use*. *International Organization for Standardization*.
- Ferdows, K., & DeMeyer, A. (1990). Lasting Improvements in Manufacturing Performance: In Search of a New Theory. *Journal of Operations Management*, 9, pp. 168-184.
- Fine, C. H. (1983). *Quality Control and Learning in Productive Systems*. Unpublished doctoral dissertation, Stanford University, Stanford, CA.
- Garvin, D. A. (1984). What Does “Product Quality” Really Mean? *Sloan Management Review*, 26, pp. 25-43.
- Gavronski, I., Klassen, R. D., Vachon, S., & Do Nascimento, L. F. M. (2011). A Resource-Based View of Green Supply Management. *Transportation Research Part E: Logistics and Transportation Review*, 47(6), pp. 872-885.
- Gold, S., Seuring, S., & Beske, P. (2010). Sustainable Supply Chain Management and Inter-Organizational Resources: A Literature Review. *Corporate Social Responsibility and Environmental Management*, 17(4), pp. 230-245.
- Hall, R. W., Johnson, H. T., & Turney, P. B. B. (1991). *Measuring Up: Charting Pathways to Manufacturing Excellence*. Homewood, IL: Irwin.
- Halldórsson, Á., Kotzab, H. & Skjøtt-Larsen, T. (2009). Supply Chain Management On the Crossroad to Sustainability: A Blessing or A Curse? *Logist. Res.* 1, pp. 83-94.
- Hamdy, O. M. M., Elsayed, K. K., & Elahmady, B. (2018). Impact of Sustainable Supply Chain Management Practices On Egyptian Companies’ Performance. *European Journal of Sustainable Development*, 7(4), pp.119-130.
- Handfield, R.B., & Pannesi, R.T. (1995). Antecedents of Lead-Time Competitiveness in Make-To-Order Manufacturing Firms. *International Journal of Production Research*,33(2), pp. 511-537.

- Hart, S. L. (1995). A Natural Resource-Based-View of The Firm. *Academy of Management Review*, 20(4), pp. 986-1014.
- Hillary, R. (2004). Environmental Management Systems and The Smaller Enterprise. *Journal of Cleaner Production*, 12(6), pp. 561-569.
- Hofman, P. S., Blome, C., Schleper, M. C., & Subramanian, N. (2020). Supply Chain Collaboration and Eco-Innovations: An Institutional Perspective from China. *Business Strategy and the Environment*, 29(6), pp. 2734-2754.
- Kessler E, & Chakrabarti A. (1996). Innovation Speed: A Conceptual Mode of Context, Antecedents, And Outcomes. *The Academy of Management Review*, 21(4), pp. 1143-91.
- Kleindorfer, P. R., Singhal, K., & Van Wassenhove, L. N. (2005). Sustainable operations management. *Production and Operations Management*, 14(4), 482-492.
- Koufteros XA, Vonderembse MA, & Doll WJ. (1997). Competitive Capabilities: Measurement and Relationships. *Proceedings Decision Science Institute*, pp. 1067-1068.
- Lambert, D. M., & Stock, J. R. (1993). *Strategic Logistics Management*, Irwin, Boston, MA.
- Landry, S., & Philippe, R. (2004). How Logistics Can Service Healthcare. *Supply Chain Forum Int. J.*, 5, pp. 24-30.
- Leire, C., & Mont, O. (2010). The Implementation of Socially Responsible Purchasing. *Corporate Social Responsibility and Environmental Management*, 17, pp. 27-39.
- Li, G.P. & Wei, X.X. (2014). The Implication, Measurement and Economic Consequences of Corporate Social Responsibility—Based on the Foreign Study Summary of Corporate Social Responsibility Theory. *Accounting Research*, 8, pp. 33-40.
- Linton, J. D., Klassen, R., & Jayaraman, V. (2007). Sustainable Supply Chains: An Introduction. *Journal of Operations Management*, 25 (6), pp. 1075-1082.
- Liu, Z.C. & Huang, Z.Q. (2017). A Study on Institution of Corporate Social Responsibility: A Review, Summary and Prospect. *American Journal of Industrial and Business Management*, 7, pp. 93-108.

- Mathivathanana, D., Kannana, D., & Haq, N. (2018). Sustainable Supply Chain Management Practices in Indian Automotive Industry: A Multi-Stakeholder View. *Resources, Conservation and Recycling*, 128, pp. 284-305.
- Matos, S., & Hall, J. (2007). Integrating Sustainable Development in The Supply Chain: The Case of Life Cycle Assessment in Oil and Gas and Agricultural Biotechnology. *Journal of Operations Management*, 25(6), pp.1083-1102.
- McGinnis MA, & Vallopra RM. (1999). Purchasing and Supplier Involvement in Process Improvement: A Source of Competitive Advantage. *Journal of Supply Chain Management*, 35(4), pp. 42-50.
- Mittal, V., & Sangwan, K. (2014). Prioritizing Drivers for Green Manufacturing: Environmental, Social and Economic Perspectives. *Procedia CIRP*, 15, pp. 135-140.
- Mulani, N. (2008). Sustainable Sourcing: Do Good While Doing Well. *Logistics Management*, 47(7), pp. 25-27.
- Narasimhan, R., & Schoenherr, T. (2012). The Effects of Integrated Supply Management Practices and Environmental Management Practices On Relative Competitive Quality Advantage. *International Journal of Production Research*, 50(4), pp. 1185-1201.
- Nelson, R. R. & Winter, S. G. (1991). *An Evolutionary Theory of Economic Change*, Edited by Foss, N. J., *Resources, Firms and Strategies (1997)*, Oxford Management Readers, Oxford.
- Novack, R. A., Rinehart, L. M. & Wells, M. V. (1992). Rethinking Concept Foundations in Logistics Management. *Journal of Business Logistics*, Vol. 13, No. 2, pp. 233-268.
- Olavarrieta, S. & Ellinger, A. E. (1997). Resource-Based Theory and Strategic Logistics Research, *International Journal of Physical Distribution & Logistics Management*, Vol. 27, No. 9/10, pp. 559-587.
- Pagell, M., & Shevchenko, A. (2014). Why Research in Sustainable Supply Chain Management Should Have No Future. *Journal of Supply Chain Management*, 50(1), pp. 44-55.

- Paulraj, A., Chen, I., & Blome, C. (2017). Motives and Performance Outcomes of Sustainable Supply Chain Management Practices: A Multi-Theoretical Perspective. *J Bus Ethics*, 145, pp. 239-258.
- Peteraf, M. A. (1993). The Cornerstones of Competitive Advantage: A Resource-Based View. *Strategic Management Journal*, Vol. 14, No. 3, pp. 179-191.
- Phillips, L. W., Chang, D. R., & Buzzell, R. D. (1983). Product Quality, Cost Position and Business Performance: A Test of Some Key Hypotheses. *Journal of Marketing*, 47, pp. 26-43.
- Poksinska B, Dahlgaard J, & Eklund J. (2003). Implementing ISO 14000 In Sweden: Motives, Benefits and Comparisons with ISO 9000. *International Journal of Quality & Reliability Management*, 20(5).
- Porter, M. E. (1980). *Competitive Strategy*. New York: Free Press.
- Porter, M., E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York, The Free Press.
- Porter, M. E., & Kramer, M. R. (2006). Strategy & Society: The Link Between Competitive Advantage and Corporate Social Responsibility. *Harvard Business Review*, 84(12), pp. 78-92.
- Potoski, M, Prakash, A. (2005). Covenants with Weak Swords: ISO 14001 And Facilities' Environmental Performance. *Journal of Policy Analysis and Management*, 24(4), pp. 745-69.
- Prahalad, C. K. & Hamel, G. (1990). The Core Competence of the Corporation, edited by Foss, N.J., Resources, firms and strategies (1997), Oxford Management Readers, Oxford.
- Raines Summers, S. (2002). Implementing ISO 14001 – An International Survey Assessing the Benefits of Certification. *Corporate Environmental Strategy*, 9(4), pp. 418-426.
- Rondinelli, D, Vastag, G. & Panacea, (2000). Common Sense, Or Just a Label? – The Value of ISO 14001 Environmental Management Systems. *European Management Journal*, 18(5), pp. 499-510.
- Rivera-Camino, J. (2001). What Motivates European Firms to Adopt Environmental Management Systems? *Eco-Management and Auditing*, 8(3), pp. 134-143.

-
- Rumelt, R. (1984). Towards A Strategic Theory of the Firm, edited by Foss, N. J., Resources, firms and strategies (1997), Oxford Management. Readers, Oxford.
- Samir, K.S., (2007). Green Supply-Chain Management: A State-Of-The-Art Literature Review. *Int. J. Manage. Rev.*, 9(1), pp. 53-80.
- Seuring, S., & Müller, M. (2008). From A Literature Review to A Conceptual Framework for Sustainable Supply Chain Management. *J. Clean. Prod.*, 16, pp. 1699-1710.
- Shi, V. G., Koh, S. C. L., Baldwin, J., & Cucchiella, F. (2012). Natural Resource Based Green Supply Chain Management. *Supply Chain Management: An International Journal*, 17(1), pp. 54-67.
- Sluti, D. G. (1992). *Linking Process Quality with Performance: An Empirical Study of New Zealand Manufacturing Plants*. Unpublished doctoral dissertation, University of Auckland, New Zealand.
- Soroka, W. (1999). *Fundamentals of Packaging Technology*. Institute of Packaging Professionals, Vol 3.
- Stalk, G., Evans, P., & Shulman, L.E., (1992). Competing On Capabilities: The New Rules of Corporate Strategy. *Harvard Business Review*, 70 (2), pp. 57-69.
- Tan, KC, & Zailani, S. ((2016). Strategic Orientations, Sustainable Supply Chain Initiatives, And Reverse Logistics: Empirical Evidence from an Emerging Market. *International Journal of Operations & Production Management*, Vol. 36, Iss 1 pp.
- Tracey, M., Vonderembse, M.A., & Lim, J.S. (1999). Manufacturing Technology and Strategy Formulation: Keys to Enhancing Competitiveness and Improving Performance. *Journal of Operations Management*, 17(4), pp. 411-28.
- Vickery, S.K., Droge, C., & Markland, R.E., (1993). Production Competence and Business Strategy: Do They Affect Business Performance? *Decision Sciences*, 24 (2), pp. 435-455.

- Vickery, S.K., Droge, C., & Markland, R.E., (1994). Strategic Production Competence: Convergent, Discriminant and Predictive Validity. *Production and Operations Management*, 3 (4), pp. 308- 318.
- Vickery, S.K., Droge, C., & Markland, R.E., (1997). Dimensions of Manufacturing Strength in The Furniture Industry. *Journal of Operations Management*, 15 (4), pp. 317-330.
- Walkera, H., Di Sistob, L., & Mcbain, D. (2008). Drivers and Barriers to Environmental Supply Chain Management Practices: Lessons from The Public and Private Sectors. *Journal of Purchasing & Supply Management*, 14, PP. 69-85.
- Ward, P.T., Leong, G.K., & Boyer, K.K., (1994). Manufacturing proactiveness and performance. *Decision Sciences*, 25 (3), pp. 337-358.
- WCED - World Commission on Environment and Development. (1987). *Our common future, Environment: Science and Policy for Sustainable Development*.
- Wisner, J. D., Tan, K.-C., & Leong, G. K. (2014). *Principles of Supply Chain Management: A Balanced Approach*. BOOK hardcopy (4th ed.). Mason, OH: South Western Cengage Learning.
- Yan, Y.J. (2011). Strategic Corporate Social Responsibility and Its Seven Strategies. *China University of Political Science and Law*, 3, pp. 6-8.
- Yang, Y., & Green, SB. (2011). Coefficient Alpha: A Reliability Coefficient for the 21st Century? *Journal of Psychoeducational Assessment*, 29(4), pp. 377-392.
- Zhang, M., Zeng, W., Tse, Y. K., Wang, Y., & Smart, P. (2021). Examining The Antecedents and Consequences of Green Product Innovation. *Industrial Marketing Management*, 93, pp. 413-427.
- Zhu, Q., Sarkis, J., & Lai, K.-H. (2012a). Green Supply Chain Management Innovation Diffusion and Its Relationship to Organizational Improvement: An Ecological Modernization Perspective. *Journal of Engineering and Technology Management*, 29(1), pp.168-185.
- Zhu, Q., Sarkis, J., & Lai, K. (2013). Institutional-Based Antecedents and Performance Outcomes of Internal and External Green Supply Chain Management Practices. *Journal of Purchasing and Supply Management*, 19(2), pp.106-117.

Appendix:

Questionnaire

You are being asked to take part in completing a questionnaire that will take approximately about 15 minutes related to a research titled “**the relationship between Sustainable Supply Chain Management Practices and the product’s quality in the Pharmaceutical Companies in Egypt**”. The study is being conducted with the approval of the Business Administration Department, Faculty of Commerce, Menoufia University.

We’d be honored if you agree to participate. Your response is very important to the success of this study. Responses will be confidential and used only for this research purpose. The results will be collectively reported without references to a specific person or company.

To sum up this is a short survey about the relationship between the sustainable supply chain management and its practices and their impact on the product’s quality. In each section of the questionnaire, you will be given specific instructions. Please carefully answer each question.

If you need any further information about the research, please don’t hesitate to contact me at shiry.ibrahim@yahoo.com

Many thanks for your assistance and cooperation.

Part (one): Sustainable Supply Chain Management (SSCM) practices

By adopting SSCM practices, the organization has achieved the following (1) Not at all true, (2) Scarcely true, (3) Somewhat true, (4) Considerably true, (5) Absolutely true.

SSCM practices	1	2	3	4	5
Sustainable supplier management (upstream): <ul style="list-style-type: none"> ▪ Suppliers are selected using environmental criteria. ▪ Cooperation with suppliers for sustainable objectives. ▪ Provides suppliers with design specifications that include green or environmental requirements. ▪ Ensure purchased components are free of undesirable items or hazardous materials. 					

SSCM practices	1	2	3	4	5
<ul style="list-style-type: none"> ▪ We develop a mutual understanding of responsibilities regarding sustainability performance with our suppliers. ▪ Provide suppliers periodically with feedback about their sustainability performance. ▪ Ensure suppliers have ISO 14001. 					
<p>Sustainable operations and risk management (focal company):</p> <ul style="list-style-type: none"> ▪ The design of our processes is heavily dependent on sustainability goals. ▪ Evaluating our existing processes to reduce their impact on the environment. ▪ Design of product for reduced consumption of material and/ or energy. ▪ Design of product for reuse, recycle and/or recovery of materials. ▪ Design of product to avoid or reduce use of hazardous products. ▪ Design of products for reducing emissions of production processes. ▪ Packaging meets environmental standards. ▪ Make sure that packaging uses renewable or recyclable content or can be reusable. ▪ Minimize the use of packaging materials. 					
<p>Pressure & incentive management (downstream):</p> <ul style="list-style-type: none"> ▪ Sustainability is considered in warehousing and materials management. ▪ Determination of quantity based on information systems. ▪ Development of collaborative arrangements with trading partners to manage inventory of functional products 					

SSCM practices	1	2	3	4	5
<p>(non-critical medical supplies) with high and stable demand.</p> <ul style="list-style-type: none"> ▪ Products are stored at appropriate distribution points close to customers in the supply chain. ▪ Collect unwanted products from customers for recycling, reclamation of materials, reuse or remanufacturing. ▪ Improvement in the corporate image of our firm in terms of the same being responsible towards its employees. ▪ Improvement in the corporate image of our firm in terms of the same being responsible towards the community. 					
<p>Other SSCM practices:</p> <ul style="list-style-type: none"> ▪ Uses Supply Chain IT software to provide access and reporting of transaction data between your company and its supply chain members. ▪ Regular inspection and maintenance of environmental protection facilities and equipment. ▪ Collaborates planning with suppliers to enable alerts of potential supply disruptions. ▪ Acquisition of ISO 14001 certification. 					

Part (Two): The Product Quality

Listed below are critical success factors for competing (by the product quality) in an industry. For each of the item below, please circle the number that best describes the extent to which you agree or disagree with the following statements. (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 =strongly agree)

Product quality	1	2	3	4	5
<ul style="list-style-type: none"> ▪ Our goods are of high quality. ▪ Defects in our goods are appropriate. ▪ Specifications of good are appropriate. ▪ Working conditions and safety are appropriate. ▪ Goods do not harm the environment. 					

Part (Three): Demographic characteristics

- Age
 - From 20-29
 - From 29-39
 - From 39-49
 - From 49-60
- Gender
 - Male
 - Female
- Job Title
 - Manager
 - Supply Chain Manager
 - Operations Manager
 - Other
- Years stayed at the organization
 - Under 2 years
 - 2–5 years
 - 6-10 years
 - Over 10 years